

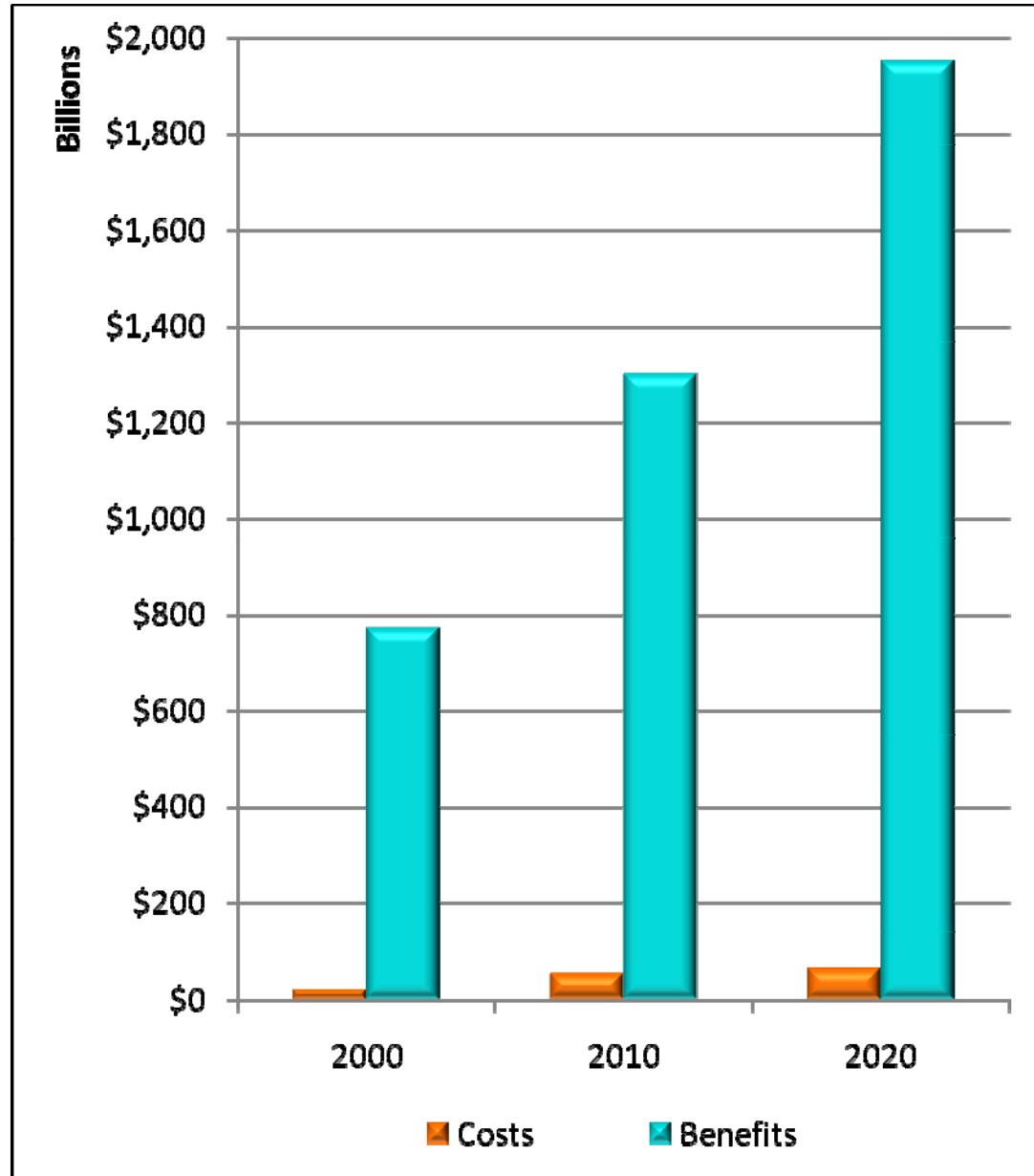
# Graphics Stack for Section 812 Second Prospective Study

US EPA Office of Air and Radiation

**Clean Air Act Section 812  
Second Prospective Study.**

US EPA. *The Benefits and Costs of the Clean Air Act from 1990 to 2020: Summary Report.*  
Feb 2011

**Exhibit 1. Primary Central Estimates of direct benefits and direct costs for the 2000, 2010, and 2020 study target years. (In billions of 2006 dollars). The graph shows the extent to which benefits exceed costs throughout the study period.**



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**Exhibit 2. Clean Air Act Section 312  
statutory language (abridged) as  
amended by Section 812 of the 1990  
Amendments. The text of the law  
defines Congress' direction to EPA  
regarding the scope and review of  
these studies.**

**CLEAN AIR ACT SEC. 312. ECONOMIC IMPACT ANALYSES (as amended,  
in part):**

- (a) The Administrator...shall conduct a comprehensive analysis of the impact of this Act on the public health, economy, and environment of the United States...
- (b) In describing the benefits of a standard described in subsection (a), the Administrator shall consider all of the economic, public health, and environmental benefits of efforts to comply with such standard...

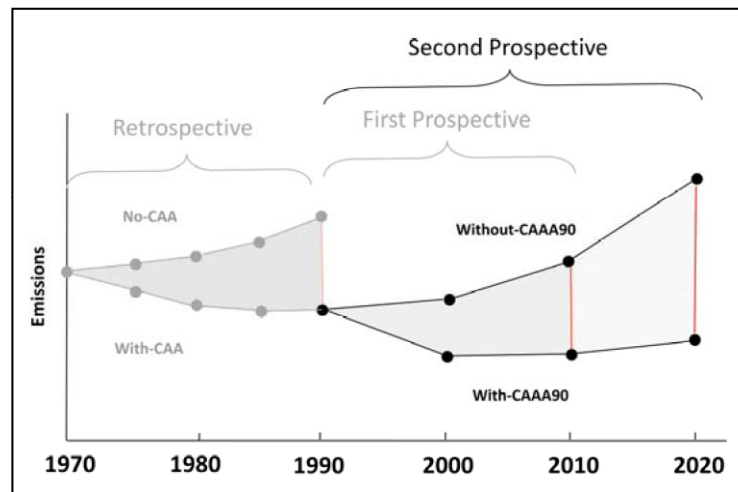
The Administrator shall assess how benefits are measured in order to assure that damage to human health and the environment is more accurately measured and taken into account...

- (c) [T]he Administrator shall consider the effects...on employment, productivity, cost of living, economic growth, and the overall economy of the United States.
- (e) [T]he Administrator...shall appoint an Advisory Council on Clean Air Compliance Analysis of...recognized experts in the fields of the health and environmental effects of air pollution, economic analysis, environmental sciences, and such other fields that the Administrator determines to be appropriate.
- (g) The Council shall-
  - (1) review the data to be used for any analysis required under this section and make recommendations to the Administrator on the use of such data;
  - (2) review the methodology used to analyze such data and make recommendations to the Administrator on the use of such methodology; and
  - (3) prior to the issuance of a report...review the findings of such report, and make recommendations to the Administrator concerning the validity and utility of such findings.

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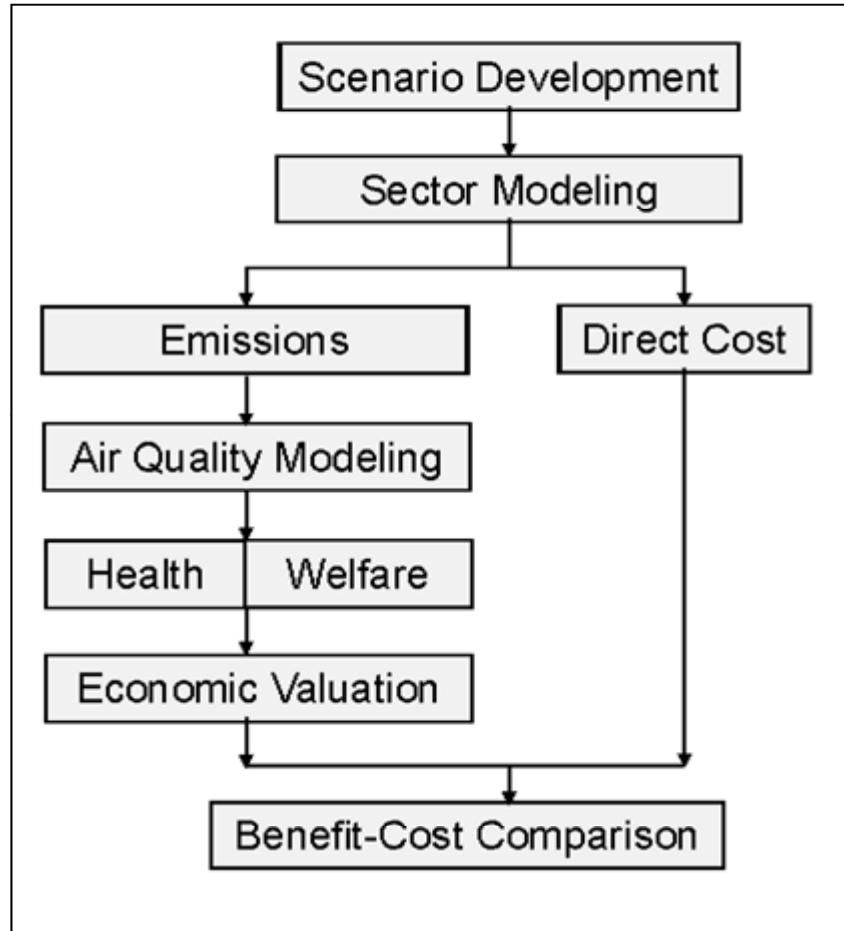
**Exhibit 3. Second Prospective Study scenarios conceptual schematic. This exhibit is a schematic depiction of the scenarios to illustrate their timing and conceptual foundations. The differences in emissions between studies and between years are not to scale and should not be viewed as a comparison of emission reductions achieved between studies or between years.**



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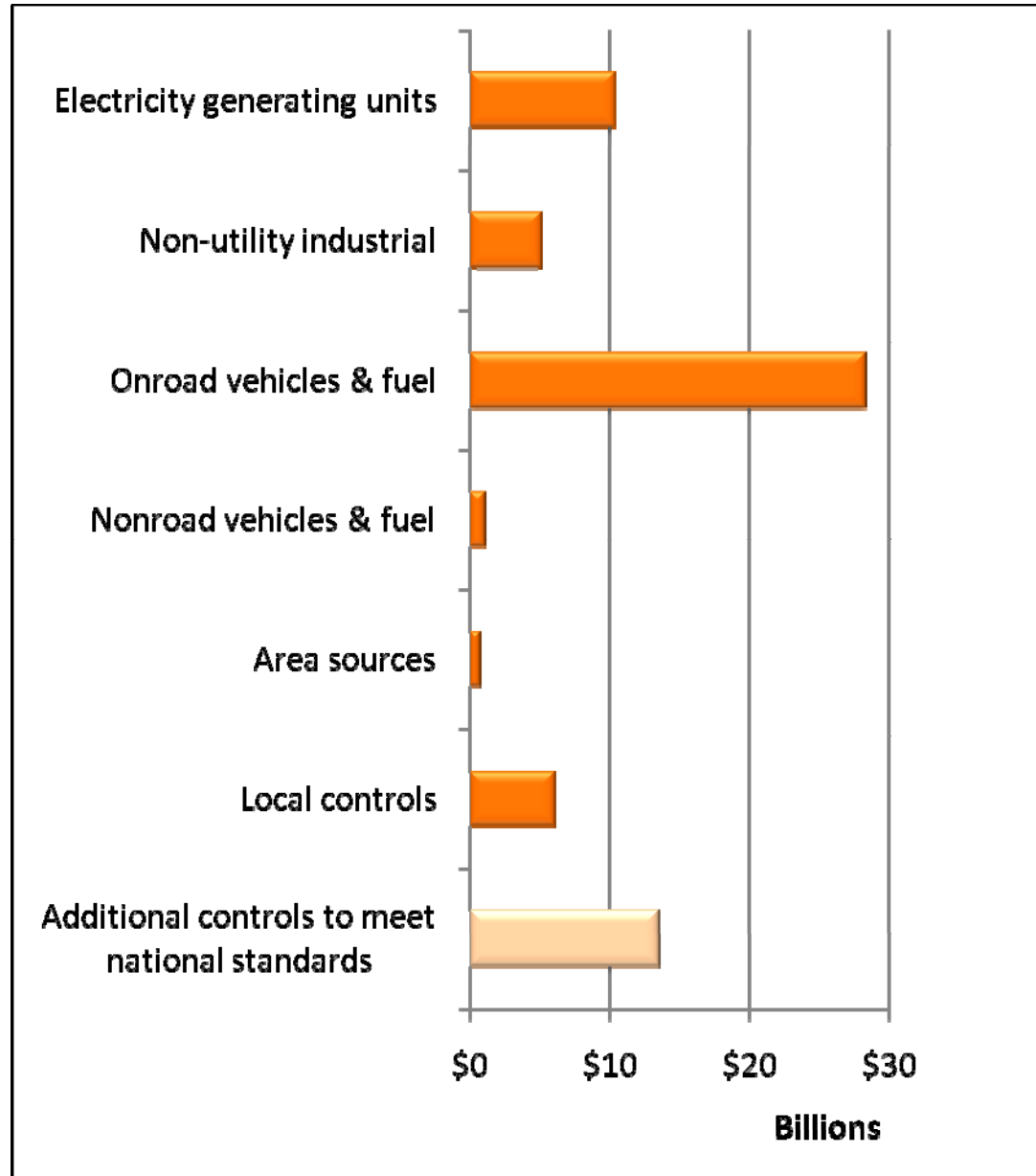
**Exhibit 4. Analytical sequence of the Second Prospective Study. This flowchart shows the order of the major analytical steps followed to conduct the study.**



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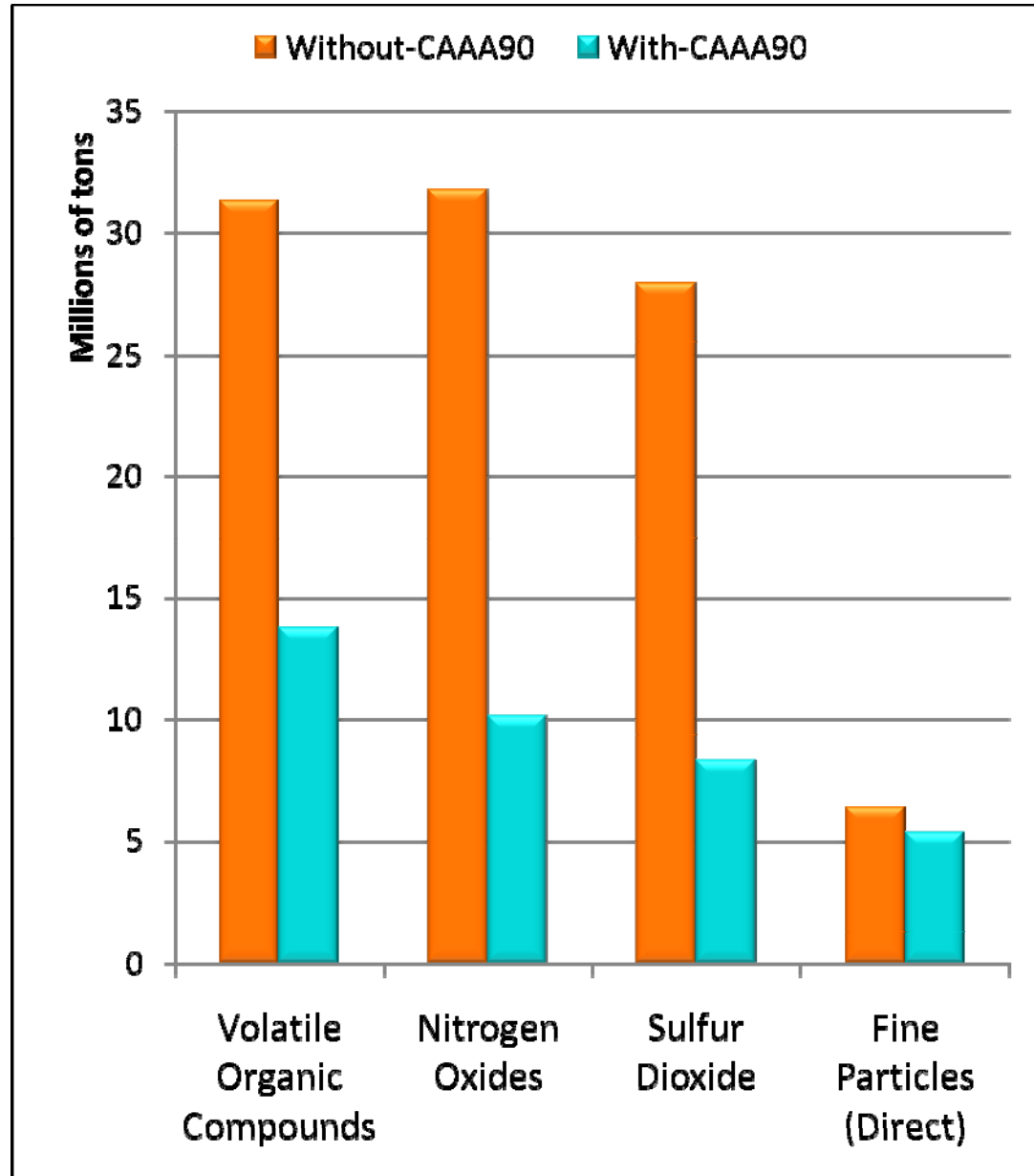
**Exhibit 5. Year 2020 direct cost of compliance by source category. (In billions of year 2006 value dollars). The first five darker orange bars show how compliance costs compare for the five major categories of emissions source. Additional controls applied to these five source categories at the local level for the purposes of meeting air quality standards are shown by the sixth darker orange bar. The lighter orange bar also reflects additional local controls but these are shown separately because their costs are significantly more uncertain.**



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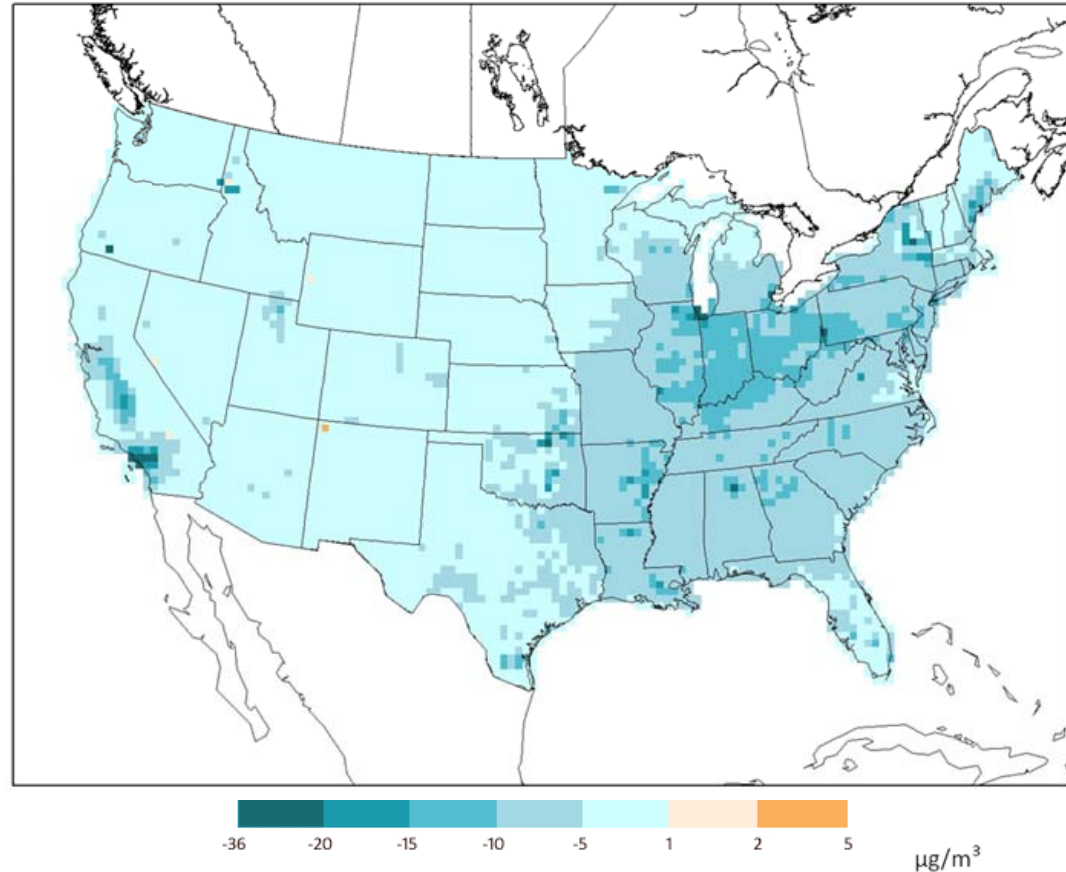
**Exhibit 6. Year 2020 key pollutant emissions under the *With-CAAA90* and *Without-CAAA90* scenarios. (In millions of short tons). The difference in height between the orange and blue bars for each pollutant shows the estimated reduction in that pollutant achieved by 1990 Clean Air Act Amendment programs.**



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**Exhibit 7. Difference in annual average fine particle (PM2.5) concentrations between the *With-CAAA90* and *Without-CAAA90* scenarios: *With-CAAA90* minus *Without-CAAA90* for 2020. (In micrograms per cubic meter). The map shows the change in concentrations of fine particles in the atmosphere achieved by 1990 Clean Air Act Amendment programs. The darker the blue color, the greater the improvement in air quality. The few spots of orange on the map are isolated locations where the air quality model projected slightly higher fine particle concentrations under the *With-CAAA90* scenario than under the *Without-CAAA90* scenario.**





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**Exhibit 8. Differences in key health effects outcomes associated with fine particles (PM2.5) and ozone between the *With-CAAA90* and *Without-CAAA90* scenarios for the 2010 and 2020 study target years. (In number of cases avoided, rounded to 2 significant digits). The table shows the reductions in risk of various air pollution-related health effects achieved by 1990 Clean Air Act Amendment programs, with each risk change expressed as the equivalent number of incidences avoided across the exposed population.**

Health Effect Reductions (PM2.5 & Ozone Only)	Pollutant(s)	Year 2010	Year 2020
PM2.5 Adult Mortality	PM	160,000	230,000
PM2.5 Infant Mortality	PM	230	280
Ozone Mortality	Ozone	4,300	7,100
Chronic Bronchitis	PM	54,000	75,000
Acute Bronchitis	PM	130,000	180,000
Acute Myocardial Infarction	PM	130,000	200,000
Asthma Exacerbation	PM	1,700,000	2,400,000
Hospital Admissions	PM, Ozone	86,000	135,000
Emergency Room Visits	PM, Ozone	86,000	120,000
Restricted Activity Days	PM, Ozone	84,000,000	110,000,000
School Loss Days	Ozone	3,200,000	5,400,000
Lost Work Days	PM	13,000,000	17,000,000

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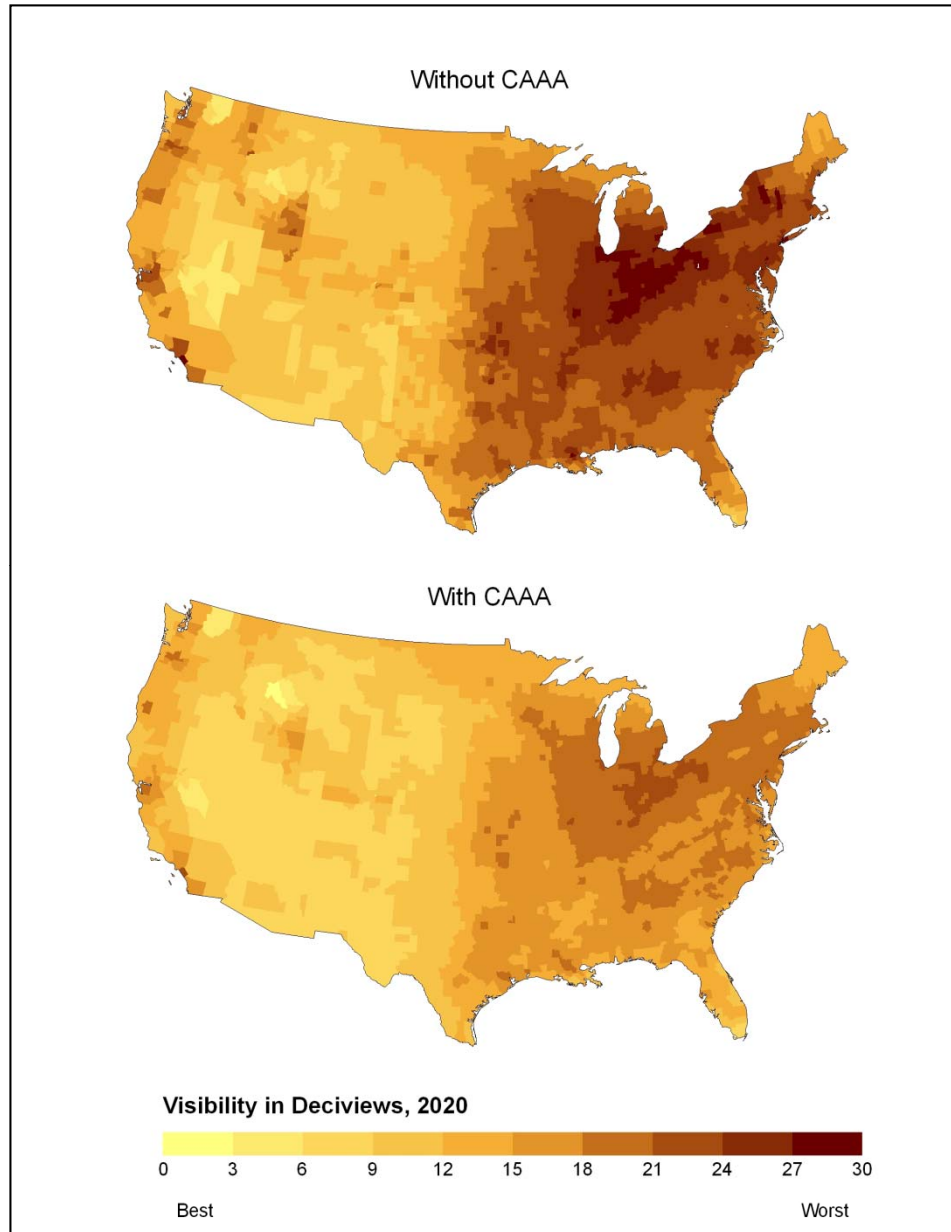
**Exhibit 9. Ecological and welfare effects included in primary estimates of benefits. For each effect in the table, the limited geographic range or the subset of effects included in the primary results is listed in parentheses.**

Quantified Human Welfare and Ecological Effects	Pollutant(s)
Visibility in residential areas (metropolitan areas)	PM, Ozone
Visibility in recreational areas (large parks in three regions)	PM, Ozone
Commercial timber (commercially important tree species)	PM, Ozone
Agriculture (commercially important crops)	Ozone
Recreational fishing (Adirondacks)	Acid Deposition
Materials damage (a few acid-sensitive materials)	Sulfur Oxides

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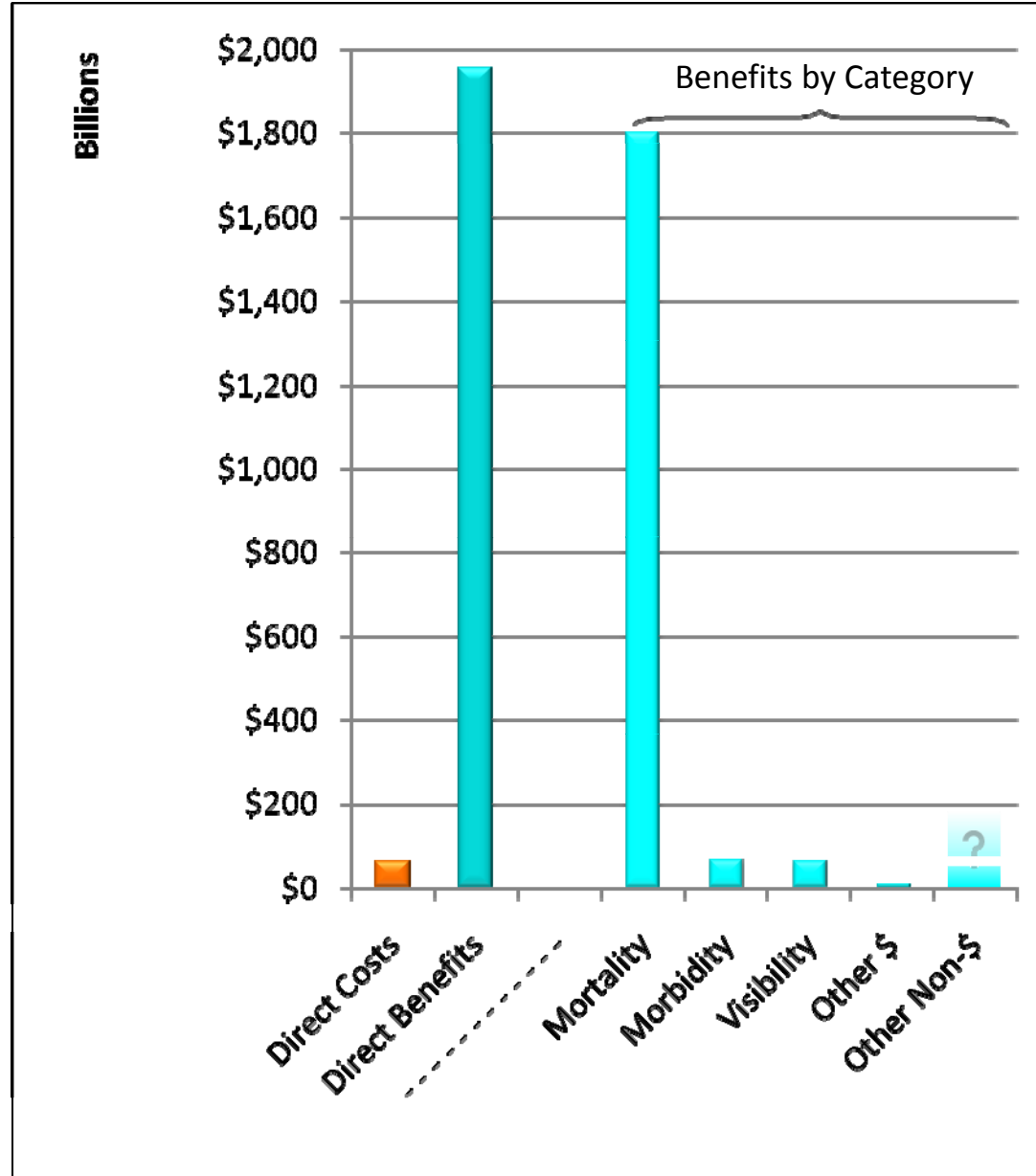
**Exhibit 10. Visibility conditions at the county level under the *With-CAAA90* and *Without-CAAA90* scenarios for 2020. (In Deciviews). The maps show visibility conditions under each scenario with lighter colors indicating better visibility.**



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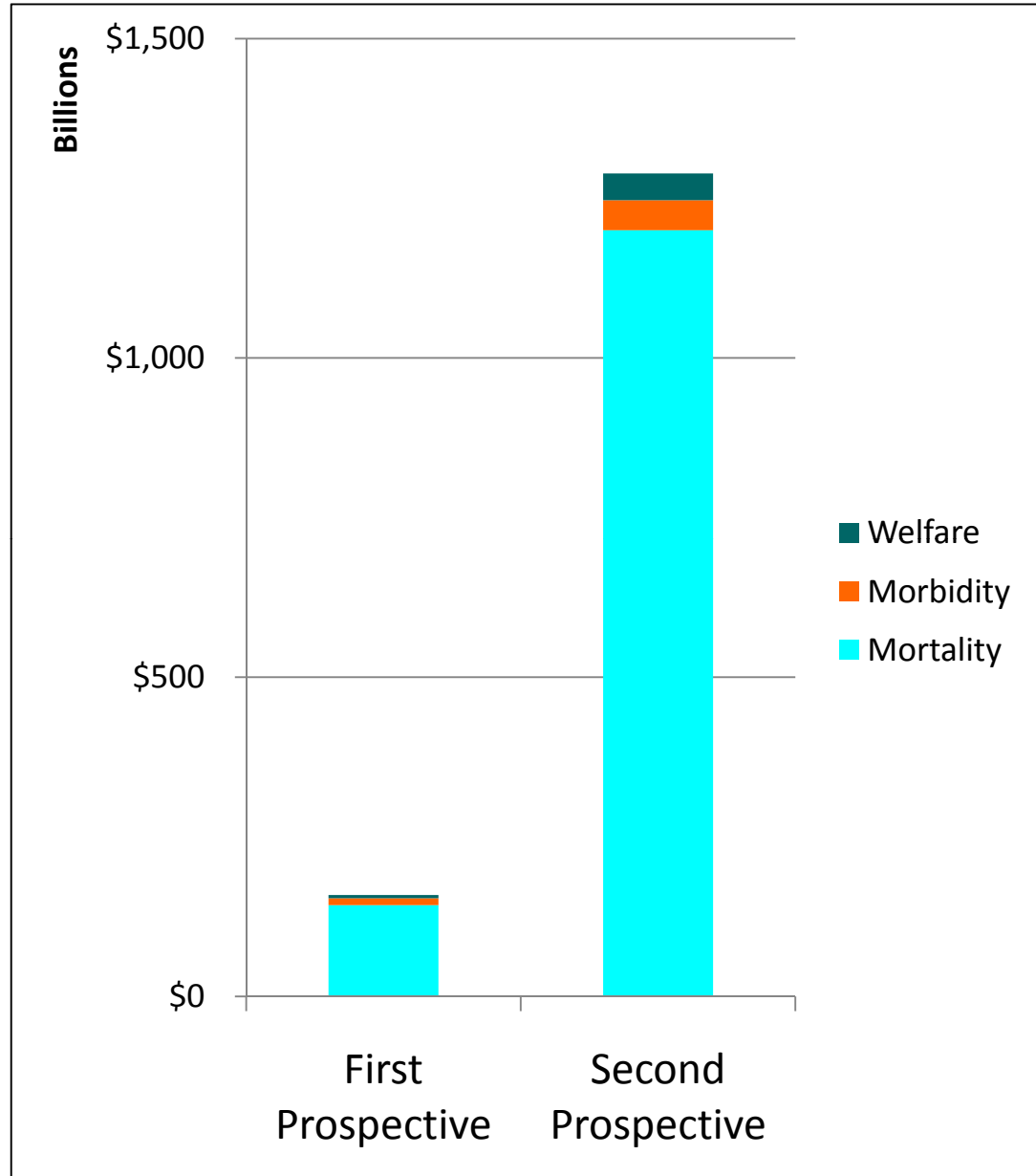
**Exhibit 11. Year 2020 Primary Central Estimates of direct costs and direct benefits with breakdown of benefits by effect category. (In billions of year 2006 dollars). The two leftmost bars show the extent to which total benefits exceed total costs, and the bars to the right provide the breakdown of benefits by category of effect. The third bar shows the extent to which mortality reduction benefits exceed all other effects, including total costs. The Other Non-\$ bar to the right is intended to emphasize the extensive benefit endpoints which could not be monetized, and the question mark indicates the potential value of these effects is unknown.**



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**Exhibit 12. Comparison of 2010  
Benefits from First and Second  
Prospective Studies. (In billions of  
year 2006 dollars)**



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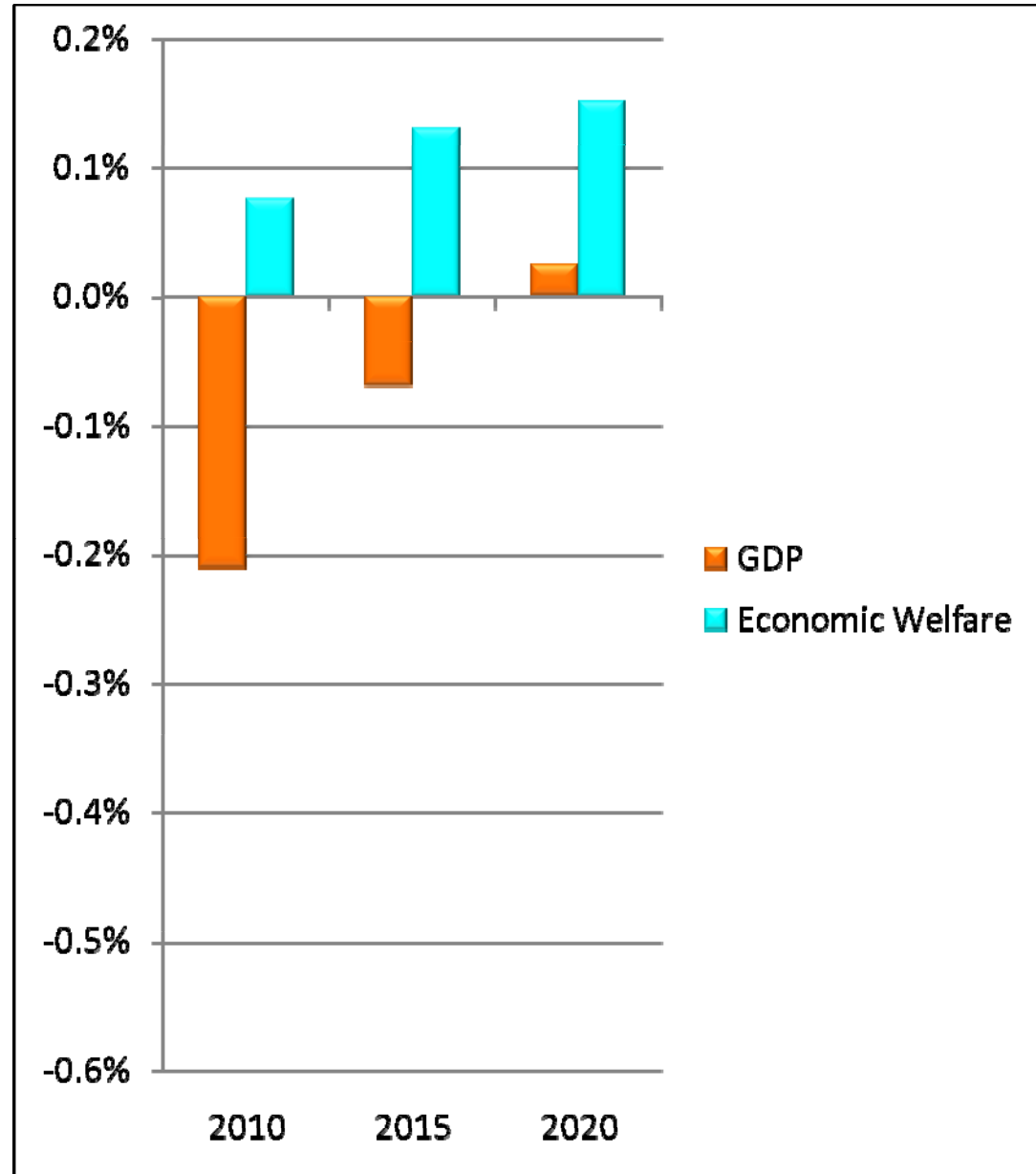
**Exhibit 13. Differences in “Cost Only” model projections of GDP and economic welfare between the *With-CAA90* and *Without-CAA90* scenarios. For the set of economy-wide model runs which excluded beneficial effects of clean air, the orange bars indicate that economic growth as measured by Gross Domestic Product is lower throughout the study period. The blue bars indicate that the measure of economic welfare generated by the economy-wide model is also lower through the end of the study’s reference period.**



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**Exhibit 14. Differences in “Cost and Partial Benefit” model projections of GDP and economic welfare between the *With-CAAA90* and *Without-CAAA90* scenarios. A comparison of this chart with the preceding one (Exhibit 13) shows the significant changes in economy-wide modeling which occurred when just two of the beneficial effects of clean air were incorporated. Economic growth as depicted by the orange bars is initially lower but by the end of the study period 1990 Clean Air Act Amendment programs lead to higher overall growth in the economy. The blue bars indicate growing improvement in the measure of household economic welfare, a result which occurs because of the two beneficial effects of cleaner air and the fact that welfare is not determined by economic growth alone. Including more of the beneficial effects of cleaner air would likely result in even greater improvements in economic growth and household economic welfare.**



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**Summary Report**

**Exhibit**